REMARKS/ARGUMENTS

The office action of May 18, 2004 has been carefully reviewed and these remarks are responsive thereto. Reconsideration and allowance of the instant application are respectfully requested. Claims 1-23, 27-35 and 43-44 remain in this application. Claims 24-26 and 36-42 were previously canceled without prejudice or disclaimer.

Claim 12 has been amended to correct a clerical error.

Claims 1-4, 13, 14, 18, 27, 28 and 32-35 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. patent no. U.S. patent no. 6,055,330 to Eleftheriadis et al. ("Eleftheriadis"). Applicant respectfully traverses this rejection.

Independent claim 1 calls for a method of producing a depth map including, among other steps, identifying at least one object within a 2D image, allocating an identifying tag to the at least one object, allocating a depth tag to the at least one object, and determining and defining an outline for the at least one object. The action alleges that Eleftheriadis shows all the elements of claim 1. In particular, the action points to col. 9, lines 17-28 to show a method of producing a depth map, col. 8, lines 52-61 and col. 17, lines 1-20 to the step of identifying, col. 10, lines 34-45 and line 65 to col. 11, line 23 and col. 18, lines 36-44 to show the step of allocating an identifying tag, col. 10, lines 13-26 and col. 17, lines 40-52 to show the step of allocating a depth tag, and col. 9, line 45 to col. 10, line 26 and col. 17, lines 40-52 to show the step of determining and defining.

Contrary to the action's assertion, applicant submits that Eleftheriadis neither teaches nor suggests a method of producing a depth map including the steps recited in claim 1. Indeed, applicants submit that Eleftheriadis is wholly unrelated to a method of producing a depth map and merely describes a technique for compressing a video signal. In order to compress the video signal Eleftheriadis needs to know the location of objects within the video image and in order to locate such objects Eleftheriadis requires a depth map. Significantly, Eleftheriadis automatically obtains depth maps from a special "depth camera" 100 that produces a video signal 101 (a conventional 2D video signal) and a depth signal (i.e. depth map). Such cameras are known in the art such as the Z-Cam from the Israeli company 3DV. At col. 9, lines 18-20 Eleftheriadis discloses that such a depth camera automatically generates a depth map: "[t]he array of depth

values, or depth map, generated by camera 100 and fed into a 16-bit wide buffer 512 via bus 511." Eleftheriadis discloses nothing more than the camera 100 automatically generating the depth map. In practice, had the original images been recorded with a depth camera as described in Eleftheriadis then there would be no need to produce a depth map according to the claim 1 invention. Namely, Eleftheriadis fails to teach or suggest method of producing a depth map including the steps of identifying, allocating an identifying tag, allocating a depth tag, and determining and defining recited in claim 1.

More specifically, Eleftheriadis discloses a method in which a depth map is used rather than a series of steps for producing a depth map. Reference to various locations in Eleftheriadis is instructive. For example, in the Abstract, Eleftheriadis makes reference to receiving depth information and converting depth information. In the description of related art, at col. 2 lines 18-22 Eleftheriadis makes reference to a technique which employs three dimensional depth information. Also, at col. 2 lines 42 and 43 Eleftheriadis makes reference to techniques which utilize three dimensional information retrieved by a stereo imaging camera. Further, at col. 3 lines 18-20, Eleftheriadis states that "there exists a need for a technique which directly utilizes three dimensional shape information." Tellingly, in the Summary of the Invention at col. 3, lines 31-32, Eleftheriadis identifies an object of the invention "to provide a technique which utilizes depth information." Given the depth information Eleftheriadis segments this information to create regions of varying perceptual importance within the frame. Col. 5, lines 40-52. Importantly, Eleftheriadis does not use segmentation to provide a depth map. Instead, given a depth map Eleftheriadis uses segmentation techniques for other purposes. Plainly, Eleftheriadis is directed to creating an improved compression method which uses available depth information rather than producing a depth map as recited in claim 1. Hence, the portions of Eleftheriadis relied on in the action to allegedly show the steps of producing a depth map merely relate to the utilization of depth information and not to producing a depth map.

In light of the foregoing, applicant submits that claim 1 is patentably distinguishable from Eleftheriadis. Claims 2-4, 13, 14, and 18, which ultimately depend from claim 1, are patentably distinct from Eleftheriadis for the same reasons as claim 1, and further in view of the novel and non-obvious features described therein.

For example, to show claim 4 the action contends that Eleftheriadis discloses identifying the object prior to the determining and defining step. In particular, Eleftheriadis discloses identifying objects by assuming an object is comprised of pixels that have a common value. Such grouping is achieved by producing a histogram as explained at col. 18, lines 40-52, which is created from the depth map "upon receiving video and depth information 1810, an object map is generated 1820 by computing a histogram 1821 of the received depth information." Hence, in Eleftheriadis the determination of objects is not made until after the depth information has been received whereas in claim 4, the depth map is produced after the determining and defining step. Also, the action contends that Eleftheriadis discloses comparing the 2D image with a library of generic scenes as recited claim 4. However, at col. 7, lines 58-62, Eleftheriadis discloses that the past and present video data is used "to generate motion vectors". Yet, generation of motion vectors does not represent the use of a library of generic scenes. Indeed, the past and present video frames are specific to the particular video sequence being processed, and will change for each sequence, and thus cannot be considered generic. Thus, for these further reasons, claim 4 is patentably distinct from Eleftheriadis.

To show that the depth tag is a numerical value as recited in claim 13, the action points to col. 9, lines 17-28. Nonetheless, applicants can not find any teaching or suggestion in the cited passage or otherwise that a depth tag is a numerical value. As to claim 14, which depends from claim 13 and recites that the numerical value ranges from 0 to 255, the action relies on the depth signal 102 including in a 16-bit linear representation at col. 7, lines 20-27. However, the depth signal 102 is not a depth tag and thus the fact that the depth signal 102 ranges from 0 to 255 is not pertinent to feature of claim 14.

The action alleges that Eleftheriadis discloses tracking at least one object as recited in claim 18 pointing to a VOP (Video Object Plane) at col. 18, lines 45-55. At col. 15, lines 48-53 Eleftheriadis defines VO and VOP as follows: "[t]he basic structure of MPEG-4 is similar to ITU H.263, except for the notion of a Video Object (VO) and a Video Object Plane (VOP). As illustrated in FIG 14, VOs are independent objects 1410, 1420, 1430 that may exist in a scene while VOPs are two dimensional images of arbitrary shape 1411, 1421, 1431." Col. 18, lines 45-55 clearly states that VOPs and not objects are tracked from one frame to another. Eleftheriadis

is wholly devoid of any teaching or suggestion of determining and assigning depth tags in the portion cited in the action or otherwise.

Independent claim 27 calls for a method of encoding a depth map. To show, the method of encoding a depth map, the action relies on col. 9, lines 17-28 of Eleftheriadis. Notwithstanding the action's contention, at col. 9, lines 26-28 Eleftheriadis states, "[t]his creates a function which gives the number of depth map pixels of a certain depth value for each depth value that is present within the depth map." Plainly, Eleftheriadis creates a function and does not teach or suggest a method of encoding a depth map. Thus, claim 27 is patentably distinct from Eleftheriadis for at least these reasons.

Claims 28 and 32-35, which ultimately depend from claim 27 are patentably distinct from Eleftheriadis for the same reasons as claim 27 and further in view of the novel and non-obvious features recited therein.

Claims 5, 19 and 21-23 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Eleftheriadis as applied to claims 1 and 2 above. Claims 6-10 and 29-31 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Eleftheriadis as applied to claims 1, 2 and 28 above and further in view of U.S. patent no. 6,029,173 to Meek et al. ("Meek"). Claims 11 and 12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Eleftheriadis as applied to claim 1 above and further in view of U.S. patent no. 5,793,900 to Nourbakhsh et al. ("Nourbakhsh"). Claims 15-17, 20, 43 and 44 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Eleftheriadis as applied to claims 1, 19 and 27 above and further in view of U.S. patent no. 4,925,294 to Geshwind et al. ("Geshwind"). Applicant respectfully traverses these rejections.

None of Meek, Nourbakhsh or Geshwind remedy the deficiencies noted with respect to Eleftheriadis. Thus, claims 5-12, 15-17, 19-23 and 43, which ultimately depend from claim 1, and claims 29-31 and 44, which ultimately depend from claim 27, are patentably distinct from the applied art for the same reasons as their ultimate base claim, and further in view of the additional advantageous features recited therein.

For example, the action contends that the combination of Eleftheriadis and Geshwind results in the inventions recited in claims 43 and 44. Claim 43 calls for a method of converting

2D images into stereoscopic images applying a depth map generated according to the method of claim 1. As discussed previously, Eleftheriadis does not produce or otherwise generate a depth map applying the steps of claim 1. In any event, the action contends otherwise, but acknowledges that Eleftheriadis does not teach or suggest converting 2D images into stereoscopic images applying a depth map. To overcome this deficiency, the action relies on Geshwind. However, Geshwind does not teach or suggest applying a depth map for converting 2D images into stereoscopic images. At col. 3, lines 23-25 Geshwind describes a human operator directly assigning depth to objects and not the creation of a depth map that is subsequently used in the 2D to 3D conversion process. Moreover, there is no suggestion, incentive or motivation in Geshwind, Eleftheriadis or otherwise to apply a depth map in converting 2D images into stereoscopic images. Namely, it would not have been obvious to modify Geshwind to replace the human operator depth assignment with the application of a depth map. Nor would it have been obvious to modify Eleftheriadis for the purpose of converting 2D images into stereoscopic images. Claim 44 is allowable over the combination of Eleftheriadis and Geshwind for some of the same reasons as claim 43.

CONCLUSION

It is believed that no fee is required for this submission. If any fees are required or if an overpayment is made, the Commissioner is authorized to debit or credit our Deposit Account No. 19-0733, accordingly.

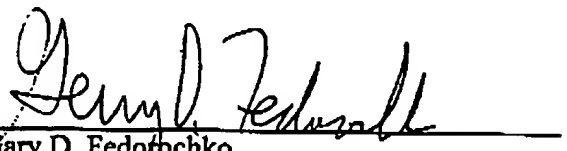
Appln. No.: 09/586,869
Amendment dated August 18, 2004
Reply to Office Action of May 18, 2004

All rejections having been addressed, applicants respectfully submit that the instant application is in condition for allowance, and respectfully solicit prompt notification of the same.

Respectfully submitted,

BANNER & WITCOFF, LTD.

Dated: August 18, 2004

By: 

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